Claude as late as his Harvey Lecture (1948) generally pleaded agnosticism about their function:

> Because of their abundance and their universal distribution, it is reasonable to assume that microsomes play a fundamental role in the economy of the cell. . . . [S]ince the microsomes were isolated in the laboratory, some ten years ago, no sure clue has been found to reveal their function although several attempts have been made, on theoretical grounds, and especially because of their high content in nucleic acid, to have them play some important role in the cells, either as plasmagenes, or agents of protein synthesis. (p. 142)

Claude doubted the findings of both Caspersson and Brachet regarding the role of RNA in protein synthesis, because he questioned how protein synthesis could proceed once separated from the site of oxidative respiration. Instead he suggested that RNA may be involved in anaerobic respiration "either in some phase of the anaerobic mechanism, or act as intermediate in the energy transfer for various synthetic reactions" (p. 163). The basis for this speculation was the correlation of both RNA and fermentation in yeast and some bacteria.[18]

While agnostic about the function of the microsomes, Claude was far from agnostic about the function of the mitochondrion. The localization of key oxidative enzymes in the mitochondrial fraction led him to conclude that it was the locus of the key oxidative processes that provide the bulk of the energy for cell functioning. As he put it in his Harvey lecture, "mitochondria may possibly be considered as the real power plants of the cell" (Claude, 1948, p. 137).

6. ADDING ELECTRON MICROSCOPY AS A TOOL

As discussed in Chapter 4, in 1943–4 Claude took advantage of an opportunity to use the electron microscope at Interchemical Corporation to examine the

[18] "From these considerations one might venture the conclusions, partly facts and partly hypothesis, that, whereas most of the metabolic activity of the cell is found in the cytoplasm, the supply of energy may be segregated in various cytoplasmic entities: the aerobic respiration in the mitochondria, as already demonstrated, the anaerobic processes in the ground substance. This might explain the intense basophilia of cells in young embryos, in fast growing tissues, and in tumors, especially in areas where the circulation and the fresh supply of oxygen may be inadequate or defective. Demonstration that a relation exists between the power of anaerobic glycolysis and ribose nucleic acid distribution would permit us to consider further the possibility that the nucleus, where the cytochrome-linked respiratory system is apparently lacking, derives its energy at least in part, from loci where ribose nucleic acid is present, especially the nucleolus, and certain chromosomal regions" (Claude, 1948, p. 163).